

Aphididæ of California. XI*

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A NEW LACHNUS ATTACKING THE JAPANESE DWARF SILVER SPRUCE

Lachnus glehnus n. sp.

(Figs. 1-3)

This species is of medium size and often occurs in great numbers upon the host. It was so abundant in the Capitol Park, Sacramento, California, during the summer of 1912 that control measures were adopted to suppress it. Though the species was abundant upon two trees in the park, it was not found attacking any of the numerous other conifers in the immediate vicinity, showing that it has a decided preference for the one host, the Japanese dwarf silver spruce, *Picea gléhni* Mast., which is said to have been imported from Japan a number of years ago. There is no tangible way of accounting for its presence upon this particular tree other than it may have been imported from Japan along with the young plants and have persisted upon them ever since. It has some characters common with *Lachnus ponderosa* Williams, as will be seen in examining the differences pointed out by John June Davis near the end of the article.

The following description is based upon two selected individuals, a winged and an apterous viviparous female, which have been designated as types. In addition to these the writer has examined 28 mounted winged viviparous females and 37 mounted apterous viviparous females. Unless otherwise stated the descriptions will refer only to the type specimens.

* This is a continuation of the series of articles entitled "Aphididæ of Southern California" by the same author.

(Fig. 1)

WINGED VIVIPAROUS FEMALE

General appearance: The general appearance and shape of the body are well shown by the photograph (Fig. 1) which illustrates especially well the white powdery covering arranged in somewhat definite pattern on the dorsum. The body is rich amber-brown in color, but cannot be seen except by removing the powdery covering.

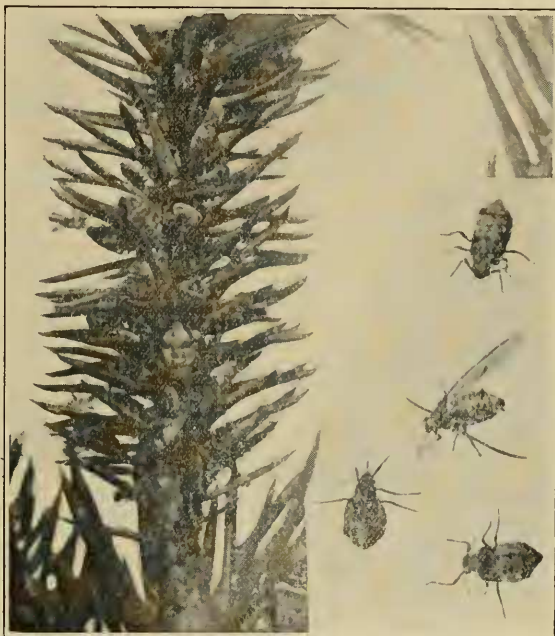


Fig. 1—*Lachnus glehnus* n. sp. Photograph showing a colony on a small twig at the left and the general appearance of the various forms at the right. (Original.)

Size: The size is about average of the members of the genus, the length being 3.5 mm. and the width at the bases of the cornicles, 1.9 mm. *Head:* Considerably wider than long, dusky amber in color with very distinct longitudinal, median suture. *Eyes:* Large, very dark red to almost black and with very small lateral tubercle at the posterior margin. *Antennæ:* Rather short, reaching just beyond the thorax, curving slightly toward the front when at rest;

dusky throughout except the base of article III, which is amber. The length of the articles of the right member are : I, 0.08 mm.; II, 0.09 mm.; III, 0.34 mm.; IV, 0.16 mm.; V, 0.2 mm.; VI, 0.17 mm.; total, 1.04 mm. When held bent in natural position the length from the base to the tip, measuring straight across, is 0.98 mm. The length varies considerably with the individuals, as will be seen by comparing the drawings (Fig. 3B), which are made to the same scale, and by comparing the two members of the same individual. The sensoria are few, but quite large and circular in shape. They are distributed as follows :

	Article III	Article IV	Article V
Right member	4	1	2
Left member	4	2	2

In nearly every case the sensoria are confined to the apical portion of the articles—to the apical two-thirds or half of III and near the tip of IV and V. There is considerable variation in both the number and location of the sensoria, as will be seen in Fig. 3B. The tabulated results showing the number and position of sensoria in a number of specimens are given below, as follows :

Article	Number of sensoria	Number of articles
III	1	1
	2	11
	3	18
	4	13
	5	3
	6	1
IV	1	17
	2	29

In no case was article V noted with more or less than two. They are sometimes located slightly different and often one is larger, but the number is constant. All the articles are clothed with long hairs. *Prothorax*: Very short and scarcely wider than the head, nearly black above and dark amber on the sides and ventral surface. *Mesothorax and Metathorax*: Muscle-lobes black, sides dark amber, ventral surface black except immediately around the coxæ.

There appears to be a small lateral tubercle on the side of the mesothorax near the front at the base of each primary wing. *Abdomen*: Dark reddish-brown with dark spots on the sides and dorsum, widest at the bases of the cornicles. *Cornicles*: Very short and thick as shown in Fig. 2, E, very hairy, black, length 0.22 mm., width 0.38 mm. *Legs*: Normal in size, all dark except the bases of the femora and the middles of the tibiae which are light amber, hairy, hind tibiae distinctly bowed inwardly, first tarsal joint about half the length of the second (Fig. 2, F and Fig. 3, C). *Wings*: The wings are rather slender, hyaline with dusky amber veins. (Fig. 2, A and Fig. 3, A.) *Primary*: Medium in size with normal venation. Costal and subcostal veins wide. Stigma dusky brown, long

(Fig. 2)

and narrow with the opposite sides nearly parallel. Stigmal vein wide and distinct at base becoming narrower towards the tip; slightly curved inwardly toward front margin. First and second discoidals distinct, the first straight and the second slightly curved. Third discoidal very indistinct, slightly curved; first fork one-third the distance from the base to the tip; second fork not quite one-half the distance from the first fork to the tip. There are small faintly clouded areas at the tips of the stigmal and discoidal veins as shown in the illustrations. Length, 3.6 mm.; width, at the tip of the second discoidal, 1.2 mm. *Secondary*: All of the veins are distinct and dark amber in color. Subcostal slightly bent as shown in the drawings. Discoidals with bases quite far apart, the first arising about one-fifth and the second two-thirds the distance from the base to the tip of the subcostal. There are also small dusky areas at the tips of these veins. Length 2.3 mm.; width near the middle, 0.7 mm. *Cauda*: Dark or nearly black around the margins, short, rounded and hairy.

The entire body is thickly clothed with quite long hairs, which are very noticeable.

APTEROUS VIVIPAROUS FEMALE

General appearance: The body shape is much like that of many species of this genus, being distinctly pyriform and widest at the

bases of the cornicles and narrowest at the head. The color of the body proper is deep amber or reddish-brown. The surface is covered with a very fine whitish powder which is arranged more or less definitely as shown in the photograph (Fig. 1), and which gives a decided gray color to the insect. *Size*: Length, 3.5 mm.; greatest width, 2.1 mm. *Eyes*: Dark red. *Head*: Dark reddish-brown with black front and black spots on the dorsum. *Antennæ*: Dusky, excepting the base of Article III which is light amber. They are curved inwardly and reach about to the middle of the meta-

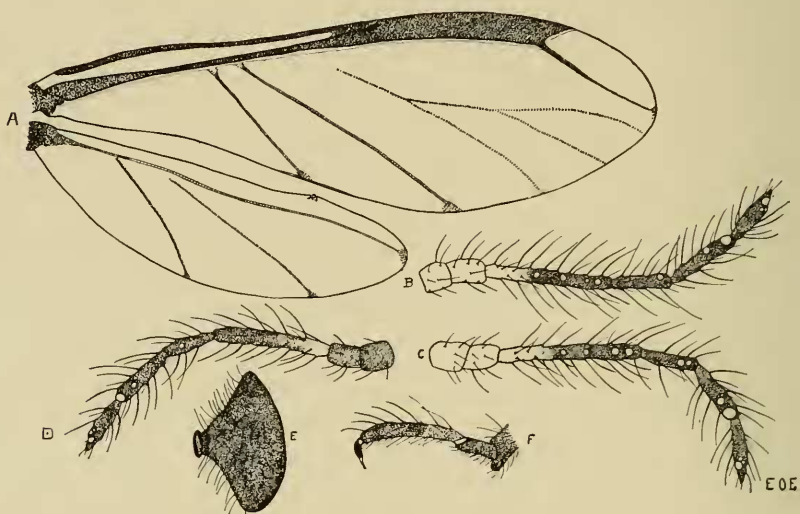


Fig. 2—*Lachnus glehnus* n. sp. A, wings of winged viviparous female; B, right and C, left antenna of winged viviparous female; D, antenna of apterous viviparous female; E, cornicle of winged viviparous female; F, hind tarsi of winged viviparous female. All of type specimens. (Original.)

thorax; hairy; the length, when held in a natural position, from the base to the tip is 0.81 mm.; the length when straightened is 1.26 mm.; the lengths of the articles are as follows: I, 0.09 mm.; II, 0.08 mm.; III, 0.31 mm.; IV, 0.14 mm.; V, 0.18 mm.; VI, 0.16 mm. The lengths vary considerably with other individuals. The sensoria are arranged on the type specimen as follows: One large sensorium near the tip of IV, two large ones (the apical one

largest) near the tip of V, and several in the process of VI. Of other individuals examined the results may be tabulated as follows:

III	0	20
	1	4
IV	0	2
	1	22
V	2	24

Rostrum: Reaches to the base of the abdomen; dark excepting the basal third which is amber. *Thorax*: Dark amber with black spots around the spiracles and on the dorsum arranged in transverse rows. *Abdomen*: Dark amber or reddish-brown, with black markings around the spiracles and black spots along the sides. *Legs*: Average in size, differing in no important respects from those of the winged form. *Cornicles*: Greatly resemble those of the winged form in size and shape as shown in Fig. 2, E. The area around the base is more mottled and not uniformly dark as in the winged form. *Cauda*: Rounded, hairy, dusky around the margins.

YOUNG

The immature forms vary from very light yellowish or amber to dark amber and may or may not be covered with the whitish powder.

FOOD PLANT

This species feeds upon the bark of the small twigs of the Japanese dwarf silver spruce, *Picea gléhni* Mast. The insects are often so abundant as to entirely cover the small branches.

LOCALITY

This species has only been taken from two trees growing together in the Capitol Park, Sacramento, Cal., near the east entrance of the Capitol Building. The trees are said to have been imported from Japan and it is possible that the insect in question was imported with them.

(Fig. 3)

DATE OF COLLECTION

The insects are most abundant during the spring and summer and were especially numerous during those months in 1912 and 1913. Serial number 62.

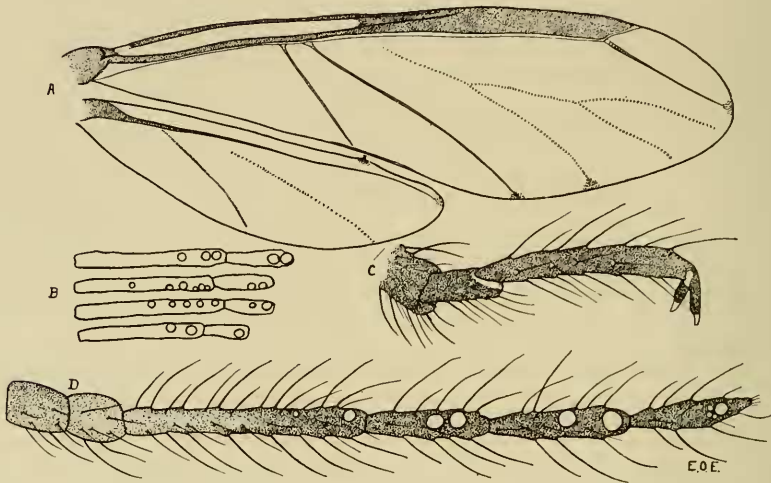


Fig. 3—*Lachnus glehnus* n. sp. A, wings of winged viviparous females; B, antennal articles III and IV of various winged viviparous females; C, tarsi of hind leg of winged viviparous female; D, antenna of winged viviparous female. From cotypes. (Original.)

GENERAL CONSIDERATIONS

Before preparing this description the writer sent specimens to many of the leading workers of the *Aphididae* in the United States and it was not until after hearing from these that the work was undertaken. Some of these workers have made some very good suggestions which I am very glad to record as follows:

"Your No. 62, collected on *Picea gléhnii* seems to be sufficiently distinct from *Lachnus ponderosa* to call it a different species. So far as I can make out from what I know of the Lachnids off hand it is a new species. It is remarkably close to *ponderosa* but one notices from the first that the hairs on the legs of *ponderosa* are comparatively short and more or less spine-like while those on the legs of

No. 62 are rather long, noticeably longer than those on the legs of *ponderosa*. In the wingless forms I notice the following differences: cornicles of *ponderosa* larger than No. 62. Hind tibia of *ponderosa* relatively longer than in No. 62. In the former antennal segment VI is about two-thirds the length of V, while in No. 62 these two segments are subequal (or nearly so). I could not make out the sensoria on the specimens you sent, but in *ponderosa* there is one sensorium on III, one on IV and one or two on V. Also the total antennal length of *ponderosa* is relatively greater than in No. 62. In the winged individuals the head of *ponderosa* does not appear to be nearly as hairy as the head of No. 62 and the eyes of the latter appear to be more pedunculated. As in the wingless the hind tibia of *ponderosa* is comparatively longer than in No. 62 and the antennæ have slight differences, but I do not know that they are dependable."—John June Davis, Lafayette, Indiana, April 23, 1913.

"No. 62 from Japanese spruce appears to me to be different from all the species I am acquainted with and based upon a superficial study, I would say that it is new."—H. F. Wilson, Corvallis, Oregon, March 15, 1915.

THE MANZANITA LEAF—GALL APHIS

Phyllaphis coweni (Cockerell)

(Figs. 4-7)

SYNONYMY AND BIBLIOGRAPHY

Aphid, Cowen, J. H.—Bul. No. 31, Tech. Ser. No. 1, Colo. Agrcl. Exp. Sta., p. 125, 1895.

Pemphigus coweni Cockerell—Cockerell, T. D. A., Can. Ent., XXXVII, p. 391, 1905.

Phyllaphis coweni (Cockerell)—Gillette, C. P., Can. Ent., XLI, p. 41, 1909.

Cryptosiphum tahæuse Davidson—Davidson, W. M., Jr. Ec. Ent. IV, p. 559, 1911.

Though this species is very common and abundant, producing large conspicuous red galls upon the leaves of manzanita, it has

been the cause of much confusion as is evidenced by the number of times it has been described as a new species. This confusion has been largely due to the peculiar body structure which has made its classification somewhat difficult.



Fig. 4—Photograph of manzanita branch showing the galls on the leaves made by the manzanita leaf-gall aphid, *Phyllaphis coweni* (Cockerell). Natural size. (Original.)

Because of its abundance throughout the state and the many inquiries received regarding it a description in a local publication will undoubtedly be welcomed.

STEM MOTHER

(Fig. 5)

During the late summer and fall of the year the young leaf galls appear in great numbers upon the manzanita bushes as a result

of the attacks of the stem mothers which are numerous at that season and which are busily engaged in giving birth to the succeeding generations. These individuals are easily recognized by their broadly pyriform or robust bodies which are sometimes partially covered with much or little white cottony secretion. The color of the body varies from amber-brown to dark olive-green with dark broken

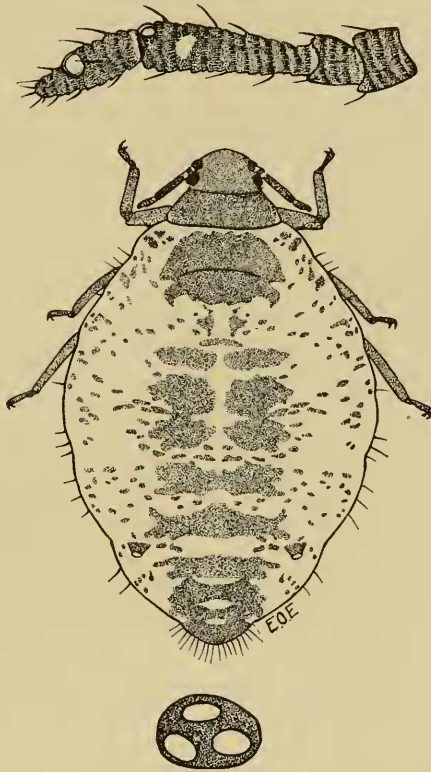


Fig. 5—*Phyllaphis coweni* (Cockerell). Stem mother with enlarged drawing of an antenna at the top and a compound eye at the bottom. (Original.)

transverse bands on the dorsum as shown in Fig. 5. The entire body is covered with many very short hairs. The usual length varies from 1.5 mm. to 2 mm. and the greatest width from 0.6 mm. to 1 mm. The head is small and narrower than the prothorax. The compound eyes are small and consist of three focets each which

resemble groups of ocelli. They are dark red. True ocelli are not visible in the writer's specimens. The antennæ are short, scarcely reaching to the base of the prothorax; dusky; the entire surface covered with very short spine-like hairs arranged in concentric rings, and a few longer hairs; 4-articled (in some specimens there is an indication of a division in article III, making 5 articles). The lengths of the articles are approximately as follows: I, 0.05 mm.; II, 0.04 mm.; III, 0.15 mm.; IV, 0.09 mm.; total, 0.33 mm. The sensoria are few, nearly circular and distributed as follows: one large circular one near the tip of III and several smaller ones in the process of IV (there is also usually a noticeably clear semi-circular area, free from the small spines near the middle of III which has the appearance of a sensorium, but which is evidently not one). The thorax gradually widens from the head and is of the same general color as the abdomen. The abdomen is broadest at the middle or near the posterior end, marked with dark, broken transverse bands on the dorsum. The cornicles are short, scarcely extending above the surface of the abdomen, noticeably wider at the base, dark, hairy, located near the posterior end on the 6th abdominal segment. In many specimens the writer was unable to locate cornicles at all and is led to believe that they are not present in all specimens. Dr. Cockerell mentions the absence of cornicles in specimens taken by him. The legs are short and rather frail-looking for the size of the body, hairy and dusky. The cauda is broadly rounded, dusky and quite hairy.

WINGED OVIPAROUS FEMALE

(Fig. 6)

The general color of the winged oviparous female is dark olive-green, with the muscle lobes, nearly all of the head, antennæ, legs and the markings on the dorsum of the abdomen dusky or black. There is a lateral mass of white cottony wax on either side of the abdomen designated by the dark areas in the vicinity of the cornicles shown in the drawing (Fig. 6). The normal length ranges from 1.5 mm. to 1.8 mm. and the width from 0.6 mm. to 0.8 mm. The head

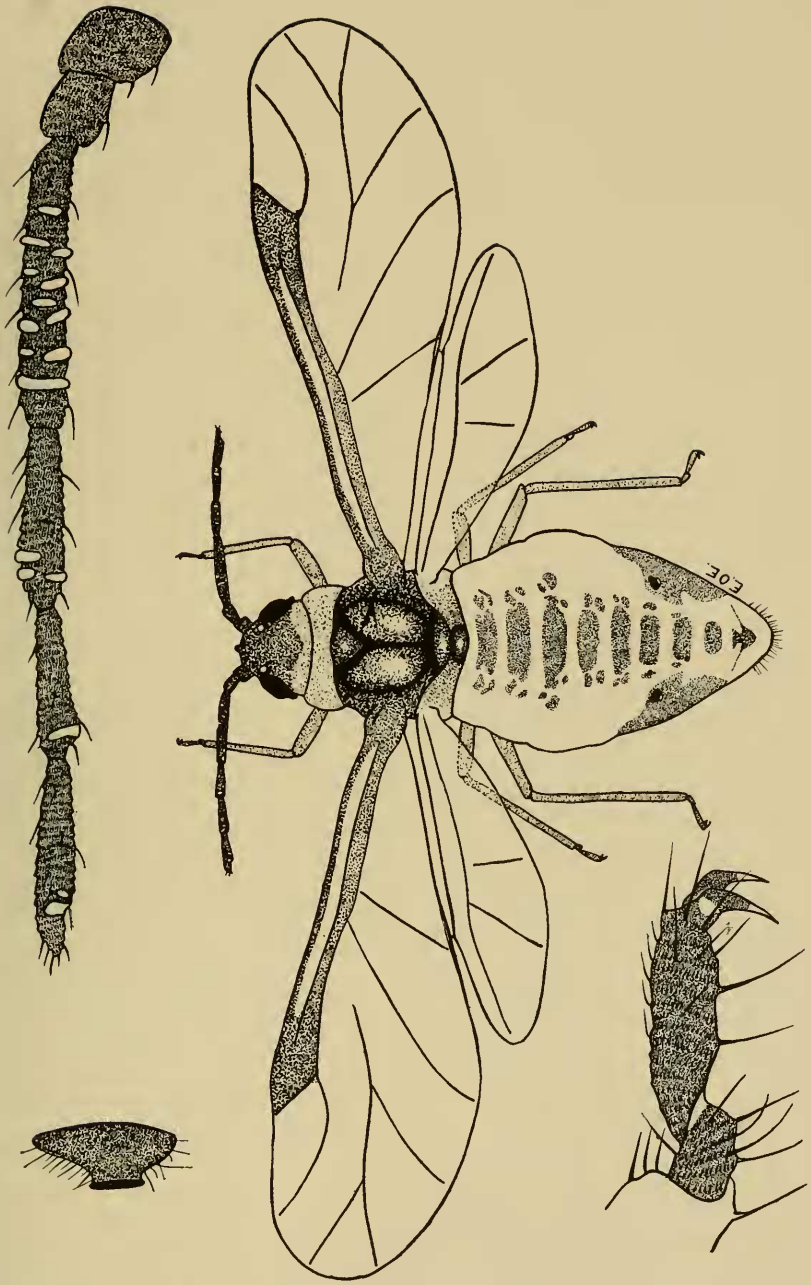


Fig. 6—*Phyllaphis coweni* (Cockerell). Winged oviparous female with detail drawings of the antenna, cornicle and hind tarsi. (Original.)

is dusky-black excepting the base which is olive-green; only slightly narrower than the prothorax. The eyes are dark red or brown with well developed lateral tubercles. The antennæ are dusky brown or nearly black with numerous concentric rows of short dark spines as in the stem mother and all other forms of this species; 6-articled; few normally long spines. The lengths of the articles are as follows: I, 0.055 mm.; II, 0.05 mm.; III, 0.23 mm.; IV, 0.13 mm.; V, 0.12 mm.; VI, 0.14 mm.; total, 0.725 mm. The length varies with the size of the adult and the measurements may differ considerably from those given above. The sensoria are large, transverse and vary somewhat in number and location. Of a large number of specimens examined the following tabulations are normal: III, from 8 to 15; IV, from 1 to 5; V, 1; VI, 2. The thorax is dark olive-green with the muscle lobes black. The abdomen is dark olive-green with irregular dark-brown or nearly black markings as shown in Fig. 6. In the living forms a white cottony wax is secreted from the sides near the cornicles and partially hides the body. The cornicles are very short, wider than long, hairy and black. The wings are hyaline with dusky-amber veins. The primary wings are 2 mm. long and 0.7 mm. wide. The venation is shown in Fig. 6. The secondary wings are narrow, 1.2 mm. long and 0.3 mm. wide. The legs are rather small, dusky-brown with few hairs. The cauda is broadly rounded with long spine-like hairs.

WINGED VIVIPAROUS FEMALE

The size, color, shape and general appearance are much the same as the winged oviparous female just previously described. The white waxy secretions of the abdomen, however, are wanting and the dark markings on the dorsum of the abdomen are often very indistinct. In some specimens the tips of the middle and hind tibiæ are noticeably enlarged.

IMMATURE FORMS

The immature forms are almost transparent and colorless when first born, but gradually assume a yellowish-green and finally an amber or dark olive-green color with the markings of the adult forms.

MALE

(Fig. 7)

The male is only about half as large as the other forms and is usually easily recognized by the small size and slender yellowish body.

The front and lateral margins of the head, antennæ, legs, muscle lobes are dusky and the remainder of the body varies from yellowish in most individuals to pale yellowish-green in others. Occasionally the posterior end of the abdomen is faintly dusky. The length is about 0.85 mm. and the width 0.3 mm. The head is nearly as wide as the prothorax with the front and lateral margins dusky. The eyes are red. The antennæ are dusky, 6-articled, entirely covered with many transverse or concentric rows of very small spine-like hairs. The lengths of the articles are about as follows: I, 0.015 mm.; II, 0.012 mm.; III, 0.063 mm.; IV, 0.035 mm.; V, 0.033 mm.; VI, 0.034 mm; total, 0.192 mm. The sensoria are transverse and vary from 5 to 7 on article III, one on each of article IV and V and two or more on VI. The prothorax is slightly wider than the head, yellow with dusky or nearly black muscle lobes. The abdomen is pale yellow or greenish throughout, except that the posterior tip is sometimes dusky. The cornicles are evidently absent as the writer was unable to locate any in eight mounted specimens. Professor Gillette does not figure or mention them in his description. The wings are hyaline with the stigma and the costal and subcostal veins prominent. The primary wings are about 1.4 mm. long and 0.5 mm. wide. The secondary wings are about 0.76 mm. long and 0.2 mm. wide. The venation is shown in Fig. 7. The legs are rather long and dusky-yellow in color. The cauda is blunt, dusky and has many long hairs.

FOOD PLANTS

This insect appears to confine its attacks entirely to different species of manzanita, there being none of the species of this plant immune so far as the writer has observed. In Colorado the common species is called bearberry (*Arctostaphylos uva-ursi*). In California

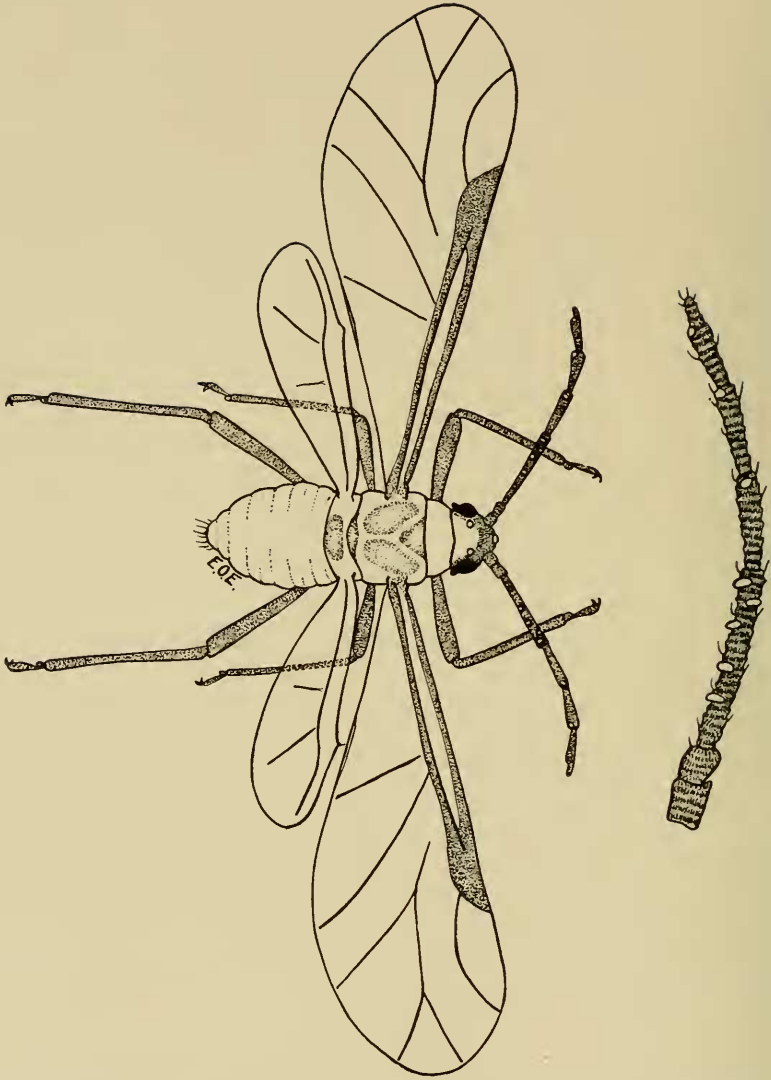


Fig. 7—*Phyllaphis coweni* (Cockerell). Male and a detail drawing of an antenna.
(Original.)

it has been taken on the following: the common manzanita (*Arctostaphylos manzanita*), the great-berried manzanita (*A. glauca*), *A. tomentosa* and *A. pumilla*. The writer has never taken it upon the latter but Mr. Davidson has recorded it. Very characteristic galls are formed at the edges of the leaves. The greater portions or the entire leaves may thus be disfigured. The galls vary in color from that of the normal leaves to very bright red. Old galls eventually die and become black with age. The shape is shown in Fig. 4.

DISTRIBUTION

The distribution of this species is wide and apparently coincides with that of the various species of the food plants. It occurs in the Rocky, Sierra Nevada and Coast Range Mountains. The writer has taken it in many parts of the state, but it appears to be most abundant in the Sierra foothills and the Coast Range Mountains in the middle and northern parts of the state, though it is abundant in the southern parts as well.

DATE OF COLLECTION

The insect is probably most abundant in August in California. At that time all forms are present in the galls and all of the writer's specimens were taken then. However, the insect persists in some active form practically throughout the entire year. Serial No. 60.

NATURAL ENEMY

Chief among the insects which prey upon this aphid is an anthorid bug. The bright red nymphs may often be found in practically every gall.

THE CLOUDY-WINGED OAK APHIS

Callipterus bellus (Walsh)

(Figs. 8 and 9)

Aphis bella (Walsh)—Proc. Ent. Soc. Phil. I, p. 299, 1862.

Callipterus bella (Walsh)—Monell, Bul. U. S. Geol. Surv., p. 29, 1879.

Callipterus walshii—Monell, Bul. U. S. Geol. Surv., p. 29, 1879.

Myzocallis bella (Walsh)—Thomas, Rep. Ent. Ill., VIII, p. 106, 1880.

Aphis bella (Walsh)—Thomas, Rep. Ent. Ill., VIII, p. 107, 1880.

Callipterus walshii (Monell)—Thomas, Rep. Ent. Ill., VIII, p. 196, 1880.

Callipterus bella (Walsh)—Thomas, Rep. Ent. Ill., VIII, p. 197, 1880.

Callipterus bella (Walsh)—Monell, Can. Ent. XIV, p. 14, 1882.

Callipterus walshii—Monell, Can. Ent. XIV, p. 14, 1882.

Callipterus bellus (Walsh)—Cestlund, Aphid, Minn., p. 43, 1887.

Callipterus bellus (Walsh)—Osborn-Sirrine, Proc. Ia. Acad. Sci. 1, III, p. 99, 1893.

Callipterus bellus (Walsh)—Osborn-Sirrine, Insect Life V, p. 236, 1893.

Callipterus bellus (Walsh)—Hunter, Bul. 60, Ia. Agrcl. Exp. Sta., p. 89, 1901.

Callipterus bellus (Walsh)—Sanborn, Kan. Univ. Sci. Bul. III, p. 40, 1904.

Callipterus bellus (Walsh)—Davis, Jr. Ec. Ent. III, p. 417, 1910.

Callipterus bellus (Walsh)—Morrison, 5th Rep. Ent. Ind., p. 216, 1912.

Callipterus bellus (Walsh)—Davis, Bull. Ill. State Lab. Nat. Hist. III, p. 114, 1913.

This is a rather small, inconspicuous aphid which often occurs in great numbers on the undersides of the leaves of the coast live oak, *Quercus agrifolia*, in the southern part of the state. To the knowledge of the writer this species has never before been reported as occurring in California. It has only been collected by S. H. Essig, who first took it at Alhambra, Cal., Jan. 28, 1912, and later at Ventura, Cal., May 27, 1913. The specimens taken were only of the different stages of the winged viviparous female. No oppor-

tunity has been afforded to study the life history and to determine if other forms appear earlier or later in the season. Specimens were sent to Mr. John J. Davis, who verified the above determination.

WINGED VIVIPAROUS FEMALE

(Fig. 8)

The adult winged viviparous females are bright or pale-yellow with dark markings on the body as indicated in the drawing. They are rather small, attaining a length of from 1.5 mm. to 2 mm. and a width one-third of the length. The head is slightly narrower than the prothorax, light-yellow with dark-red eyes. The antennæ are 6-articled and situated on slight frontal tubercles. Article I is usually the same color as the head; II, dusky-yellow; III, dusky or light-yellow; IV, yellow with dusky tip; V, yellow with the apical half dusky; VI, dusky. The lengths of the articles are as follows: I, 0.06 mm.; II, 0.05 mm.; III, 0.44 mm.; IV, 0.25 mm.; V, 0.23 mm.; VI, 0.34 mm.; total, 1.37 mm. The sensoria are circular and somewhat variable in number. There are usually 4 or 5 on III, though the number may vary from 4 to 7. They are usually confined to the basal half of the article. Article IV has none. Article V usually has one near the tip. Article VI has 2 or 3 in the process. The rostrum is very short reaching scarcely beyond the front coxæ, yellow with dark tip and very blunt. The prothorax is slightly wider than the head and about the same length, yellow with a prominent black vitta on each side extending to the full length directly behind the eyes. Each vitta is continued on the mesothorax to or slightly beyond the base of the front wing. The muscle lobes are not noticeably different in color from the rest of the thorax. The legs are the same color as the body with the following exceptions: the front tibiæ and tarsi are dusky, the tips of the middle tibiæ and tarsi and of the hind tibiæ and tarsi are also dusky. The abdomen is yellow with two prominent and one indistinct dark tubercle on the dorsum in line with and just in front of each cornicle. There are also red spots on the dorsum of some individuals. The cornicles are short, as wide at the base as the length, light-yellow

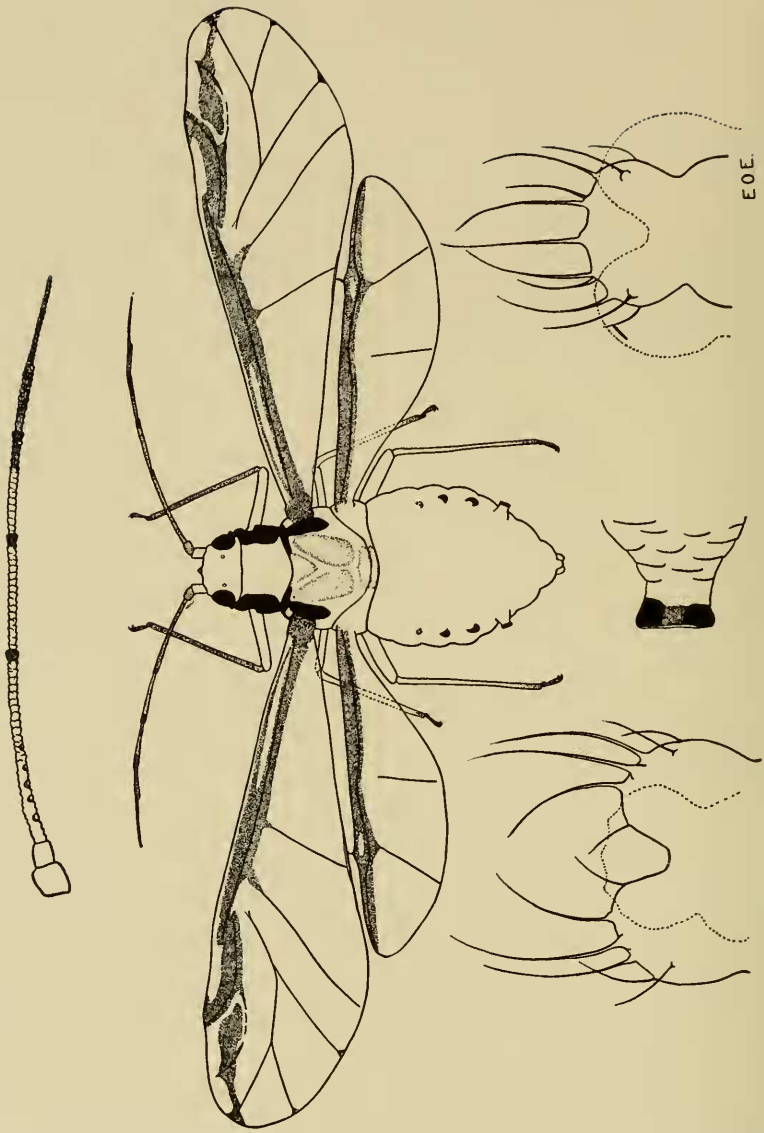


Fig. 8—*Callipterus bellus* (Walsh). Adult winged viviparous female in the middle with antenna at top, anal plate at left bottom, cornicle at middle bottom and cauda at right bottom. (Original.)

with dusky tips, 0.06 mm. long. The wings have a long narrow clouded area extending the full length along the front margins of both pairs as shown in the drawing. These markings are the most noticeable characteristic of the species. The venation is also shown in the drawing. The length of primary wings is about 2.6 mm. and the length of the secondary wings about 1.7 mm. The cauda is the color of the body or slightly dusky, distinctly knobbed and supporting several long hairs. The anal plate is distinctly bilobed and also hairy (Fig. 8).

NYPHS

The nymphs of the winged viviparous females are very transparent, pale or bright yellow when very young. They are covered with very noticeably long, capitate, glandular hairs which persist until the last moult. The fully-developed nymph is bright-yellow with dark markings on the antennal articles and dark tubercles on the dorsum as shown in Fig. 9. The tubercles are located at the bases of the glandular hairs in somewhat definite rows—at least four rows of large tubercles are noticeable and two rows of smaller ones. Sometimes there is evidence of two more rows of small spines, making 4 rows of large tubercles and 4 rows of small tubercles in all. The eyes are red. The legs are pale-yellow with the tarsi of all and the bases and tips of the hind femora dusky. In some individuals the tips of all of the femora appear dusky.

FOOD PLANTS

The food plants of this species seem to be limited to various kinds of oak trees. In the eastern states it has been taken on *Quercus rubra* by Monell¹ and Cestlund², on *Q. coccinea* by Hunter³, on *Q. macrocarpa* by Thomas⁴ and on white oak (*Q. alba* ?) by Morrison⁵. It has only been taken on the coast live oak (*Q. agrifolia*) in California.

¹ Monell, J. T., Bul. U. S. Geol. Surv. V, p. 29, 1879.

² Cestlund, O. W., Aphid. Minn., p. 43, 1887.

³ Hunter, W. D., Bul. 60, Ia. Agrcl. Exp. Sta., p. 89, 1904.

⁴ Davis, J. J., Bull. Ill. State Lab. Nat. Hist. III, p. 114, 1913.

⁵ Morrison, H., 5th Rept. Ent. Ind., p. 216, 1912.

DISTRIBUTION

This species is apparently very common in the United States east of the Mississippi River. That it occurs in California would indicate that it also occurs in other localities west of the Mississippi River. As previously stated, it has been taken in two places in California, at Alhambra, Los Angeles County, and at Ventura, Ventura County.

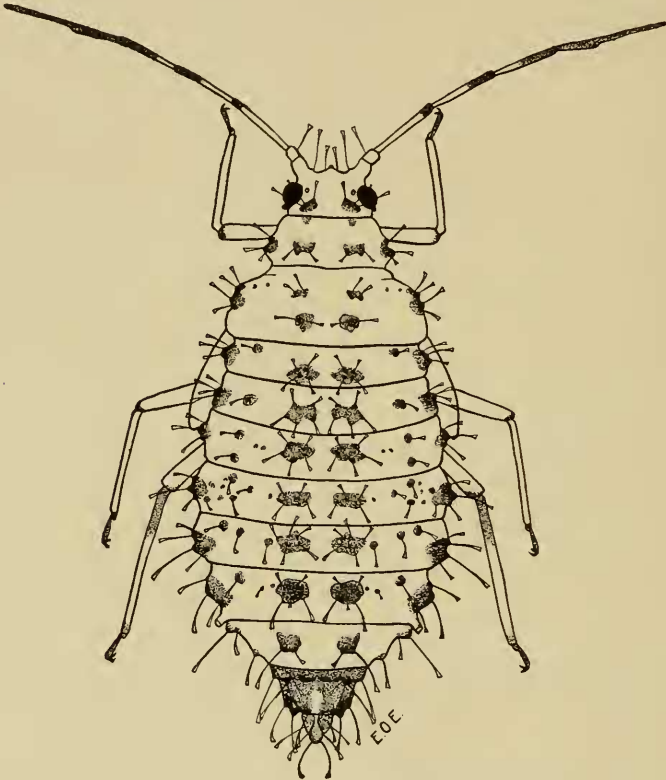


Fig. 9—*Callipterus bellus* (Walsh). Nymph of winged viviparous female. (Original.)

DATES OF COLLECTION

The specimens in the collection were taken at Alhambra Jan. 28, 1912, and at Ventura, May 27, 1913, by S. H. Essig. Serial No. 59.